

face system of the alternative embodiment is otherwise similar or identical to the user interface system 100 of the preferred embodiment. The user interface system of the alternative embodiment can be incorporated into electronic devices that do not typically include a display, such as peripheral for an electronic device. Suitable peripherals include a mouse, a trackpad, a keyboard, and a remote control. These peripherals are often used only by touch, and not by sight. The user interface system may, however, be incorporated in any suitable device.

[0047] As a person skilled in the art of user interfaces will recognize from the previous detailed description and from the figures and claims, modifications and changes can be made to the preferred embodiments of the invention without departing from the scope of this invention defined in the following claims.

We claim:

1. A user interface system, comprising:
 - a layer defining a surface;
 - a substrate supporting the layer and at least partially defining a cavity;
 - a displacement device coupled to the cavity and adapted to expand the cavity thereby deforming a particular region of the surface; and
 - a touch sensor coupled to the substrate and adapted to sense a user touch proximate the particular region of the surface.
2. The user interface system of claim 1, wherein the layer is generally elastic.
3. The user interface system of claim 1, wherein the surface is substantially continuous.
4. The user interface system of claim 1, wherein the substrate and the layer cooperatively define the cavity.
5. The user interface system of claim 1, wherein the layer and the substrate are formed as singular structure.
6. The user interface system of claim 1, wherein the cavity has at least two volumetric settings: a retracted volume setting and an extended volume setting.
7. The user interface system of claim 6, wherein the surface is substantially planar, and wherein the cavity extends beyond the plane of the surface in the extended volume setting.
8. The user interface system of claim 1, wherein the cavity includes a fluid.
9. The user interface system of claim 8, wherein the displacement device is adapted to modify the volume of the fluid to expand the cavity.
10. The user interface system of claim 9, wherein the displacement device includes a heating element to heat the fluid to modify the volume of the fluid.
11. The user interface system of claim 8, wherein the displacement device is connected to the cavity and is adapted to displace additional fluid into the cavity to expand the cavity.
12. The user interface system of claim 11, further comprising a reservoir adapted to contain additional fluid, and a channel connecting the reservoir and the cavity, wherein the displacement device displaces additional fluid from the reservoir, through the channel, and into the cavity to expand the cavity.
13. The user interface system of claim 12, wherein the displacement device is a linear actuator.
14. The user interface system of claim 12, wherein at least a segment of the channel is a micro-fluidic channel.

15. The user interface system of claim 1, wherein the deformation is a button, and wherein the touch sensor is adapted to sense a user touch that deforms the button.

16. The user interface system of claim 15, wherein the button includes a substantially dome-shaped protrusion.

17. The user interface system of claim 1, wherein the deformation is a guide, and wherein the touch sensor is adapted to sense a user touch at different locations on the surface adjacent the guide.

18. The user interface system of claim 17, wherein the guide includes a substantially ridge shaped protrusion.

19. The user interface system of claim 17, wherein the guide includes two substantially ridge shaped protrusions.

20. The user interface system of claim 1, wherein the substrate is located between the layer and the touch sensor.

21. The user interface system of claim 1, wherein the touch sensor includes the layer that defines the surface.

22. The user interface system of claim 1, wherein the touch sensor includes a capacitance touch sensor.

23. The user interface system of claim 1, further comprising a processor coupled to the touch sensor and adapted to operate the user interface system in at least the following two modes:

first mode: if the particular region of the surface is deformed, then a user touch that further deforms the particular region of the surface is recognized as a user input of a first type, and

second mode: if the particular region of the surface is not deformed, then a user touch at the particular region in the surface is not recognized as a user input of the first type.

24. The user interface system of claim 23, wherein the first mode is further defined as: if the particular region of the surface is deformed, then a user touch that does not substantially further deform the particular region of the surface is not recognized as a user input of the first type.

25. The user interface system of claim 23, wherein the second mode is further defined as: if the particular region of the surface is not deformed, then a user touch at the particular region in the surface is recognized as a user input of a second type that is distinguishable from the first type.

26. The user interface system of claim 1, further comprising a display coupled to the substrate.

27. The user interface system of claim 26, wherein the display is adapted to visually output at least two images, wherein one image includes an image of input key substantially aligned with the particular region of the surface deformable by the cavity.

28. The user interface system of claim 26, wherein the display and the touch sensor are integrated as a single device.

29. The user interface system of claim 26 wherein the display includes the layer that defines the surface.

30. The user interface system of claim 26, wherein the substrate is located between the layer and the display.

31. The user interface system of claim 30, wherein the cavity holds a fluid, and wherein the fluid and the substrate are substantially transparent.

32. The user interface system of claim 31, wherein the fluid and the substrate have substantially similar refractive indexes.

33. An electronic device having the user interface system of claim 26, wherein the electronic device is selected from the group consisting of an automotive console, a desktop computer, a laptop computer, a tablet computer, a television, a